dependencies from cancelled claims 10 and 22, respectively, to independent claims 1 and 16, respectively. Independent claims 1, 16, 28, and 32 have been amended to include the subject matter from cancelled claims 10 and 22. No new matter is believed to have been added to the subject application as a result of the changes made thereto.

At cipher 1 of the Office Action, the Examiner has objected to claims 28-34 as containing informalities requiring correction by Applicants. More specifically, the Examiner asserts:

> Claims 28-34 are objected to because of the following informalities: in claims 28 and 32, line 2, "result in the following" should be changed to --including-- or --comprising--. Claims 29-31 and 33-34 depend from claims 28 and [32, and] therefore, are objected (Office Action, page 2).

Applicants respectfully submit that the Examiner's objection to and requirement for correction of claims 28-34 are unwarranted. It is respectfully submitted that the "result in the following:" language used in independent claims 28 and 32 is clear and unambiguous, and indicates that the instruction (e.g., computer program instructions), when executed (e.g., by a computer platform), result in the performance of respective sets of operations (i.e., the respective sets of operations that follow the respective recitations of "result in the following:" in claims 28 and 32). Accordingly, it is respectfully submitted that the change to the language of claims 28 and 32 suggested by the Examiner is unnecessary. Additionally, it is respectfully submitted that if claims 28 and 32 were to be amended in the manner suggested by the Examiner, the resulting language of claims 28 and 32 would not make sense, since the resulting language would require that the instructions recited in the claims 28 and 32, when executed, would comprise or include the respective sets of operations recited in claims 28 and 32, and this result is illogical. Accordingly, it is respectfully submitted that the Examiner's objection to and requirement for correction of claims 28-34 are in error and should be withdrawn.

Also in the Office Action, the Examiner has rejected claims 1-7, 9, and 16-24 under 35 USC 102 as being anticipated by Vetro et al. ("Frequency Domain Down-Conversion of HDTV Using an Optimal Motion Compensation Scheme," Journal of Imaging Systems and Technology,

Vol. 9, No. 4, August 1998, pp. 274-282), taken singly, and also has rejected various combinations of claims 8, 10-15, and 25-34 under 35 USC 103 as being rendered obvious by Vetro et al., taken in conjunction with combinations of Ng (U.S. Patent No. 5,262,854), Dugad et al. ("A Fast Scheme for Altering Resolution in the Compressed Domain," IEEE Computer Science Conference on Computer Vision and Pattern Recognition, June 1999, pp. 213 - 218), Kim et al. (U.S. Patent No. 6,175,592), and Rosman et al. (U.S. Patent No. 6,222,550). Applicants respectfully submit that these rejections of the claims are in error.

Vetro et al. discloses techniques for down-conversion for use in a down-conversion decoder, and motion compensation schemes that are dependent upon the particular technique of down-conversion that is used. In pertinent part, Vetro et al. teaches different processing schemes that involve down-conversion and motion compensation. Significantly, Vetro et al. does not disclose or suggest using a motion compensation operation that comprises scaling motion vectors in accordance with a downsampling ratio, as is recited in claims 1 and 16, as amended.

In contrast to Vetro et al., the method of Applicants' claim 1 comprises:

> downsampling a compressed video image in the frequency domain;
> inverse transforming the downsampled video image; and
> performing motion compensation for the downsampled image in the spatial domain, the performing of the motion compensation comprising scaling motion vectors in accordance with a downsampling ratio. (Independent claim 1, as amended).

Also in contrast to Vetro et al., the method of Applicants' claim 16 comprises:

> inverse transforming a compressed video image;
> downsampling the inverse transformed image in the spatial domain; and
> performing motion compensation for the downsampled image in the spatial domain, the performing of the motion compensation comprising scaling motion vectors in accordance with a downsampling ratio. (Independent claim 16, as amended).

Independent claims 28 and 32, as amended, recite, respectively, the above language recited in independent claims 1 and 16, as amended. As is acknowledged by the Examiner at page 6 of the Office Action, these specific combinations of limitations of claims 1 and 16, as amended, are nowhere disclosed in Vetro et al (See, Office Action, page 6). Thus, given these

deficiencies of Vetro et al., it cannot be said that Vetro et al. anticipates any of the currently pending claims, as amended.

It is not seen that Ng, Dugad et al., Kim et al., and/or Rosman et al. overcome these deficiencies of Vetro et al. so as to suggest, when taken in combination with Vetro et al., Applicants' claimed invention. In pertinent part, Ng is asserted by the Examiner to disclose performing motion compensation involving scaling motion vectors in accordance with a downsampling ratio. (See, Office Action, page 6).[1] Applicants respectfully submit, however, that contrary to the Examiner's assertions, Ng does not, in fact, disclose or suggest these features. More specifically, in the portion of Ng relied upon by the Examiner, Ng discloses that 8 by 8 blocks of data from a VRAM 315 are decimated by a decimator 313 down to 4 by 4 blocks, and these 4 by 4 blocks are supplied to an adder 312 in accordance with the data format of inverse transform image data applied to the adder 312 from a decimator 311. (See, Ng, column 6, line 65 to column 6, line 7; See also, Ng's Figure 5). Significantly, Ng nowhere discloses or suggests that motion vectors (e.g., as that term in used in connection with descriptions in the subject application of exemplary embodiments of the claimed invention - see, e.g., Specification, page 9, lines 3-6) are scaled in accordance with a downsampling ratio. (See, e.g., Ng, column 6, lines 35-39). Quite simply, it cannot be said that Ng discloses or suggests the aforesaid limitations recited in claims 1 and 16, as amended, that are missing from Vetro et al.

Dugad et al. is cited by the Examiner as disclosing the use of a bilinear interpolation scheme for downsampling. (See Office Action, page 8). Kim et al. is cited by the Examiner as disclosing the display of a downsampled spatial image such that the resulting non-uniform vertical spacing of data signal lines appear substantially uniform on a low resolution monitor screen, and Rosman et al. is cited by the Examiner as disclosing use of a 3D pipeline to perform

[1] The Examiner also asserts that Ng "inherently" discloses an article comprising a storage medium having stored thereon instructions of the type described in claims 28 and 32, because "the controller 302, as a state machine, is inherently [deemed] to have a storage medium storing the program (instructions) executed by a platform because of the programming routines." (See Office Action, pages 7 and 8). Applicants respectfully traverse the Examiner's assertions, and Applicants respectfully request that the Examiner either withdraw these assertions, or provide Applicants with sufficient evidence (e.g., via personal affidavit or prior art reference) to prove that the subject matter asserted by the Examiner to be inherently disclosed in Ng necessarily must be present in Ng's disclosed arrangement. See MPEP 2112.

bilinear interpolation. (See Office Action, pages 9-11). Even assuming, *arguendo*, that Dugad et al., Kim et al., and Rosman et al. disclose these features, these references cannot be said to supply the aforesaid features of claims 1 and 16, as amended, that are missing from Vetro et al. and Ng.

Thus, it is respectfully submitted that no combination of Vetro et al., Ng, Dugad et al., Kim et al. and Rosman et al. renders obvious the claims, as amended. Thus, it is respectfully submitted that the Examiner's rejection of claims 1-7, 9, and 16-24 under 35 USC 102 as being anticipated by Vetro et al., and the Examiner's rejections of combinations of claims 8, 10-15, and 25-34 under 35 USC 103 as being rendered obvious by Vetro et al., taken in conjunction with combinations of Ng, Dugad et al., Kim et al., and Rosman et al., are in error.

Quite apart from the foregoing, Applicants note that the Office Action contains no acknowledgement from the Examiner that the Examiner has considered the references cited in the Information Disclosure Statement that was mailed on September 7, 2001 to the United States Patent & Trademark Office by Applicants. Applicants respectfully request that the Examiner consider and make of record these references in the Examiner's next communication to Applicants.

In the event that the Examiner deems personal contact desirable in further disposition of this case, the Examiner is invited to call the undersigned attorney at 781-687-1730.

Please charge any shortages and credit any overcharges to Deposit Account number 02-2666.

Respectfully submitted,

Date: 7 Feb. 2002

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MARKED-UP VERSION OF SPECIFICATION TO SHOWN CHANGES MADE

The Specification has been rewritten, as follows:

The paragraph that runs from page 22, line 18 to page 23, line 14 of the Specification has been amended, as follows:

One modification, then, for this particular embodiment is to convert a frame downscaled macroblock into a field downscaled macroblock. In this particular embodiment, as illustrated in FIG. 5, this is accomplished by reconstruction of the blocks in a macroblock at full vertical resolution in the spatial domain by inverse transformation from the DCT domain, interlacing the block into two fields and downscaling it vertically in the spatial domain. Therefore, for this embodiment, the vertical downscaling is effectively moved to after performing the inverse DCT, as illustrated in [FIG.1] FIG. 2. Likewise, motion compensation is performed on each field separately, as mentioned above. If the motion compensation were frame based, then, in this embodiment, the prediction error could be converted to field based using the technique illustrated. To convert frame motion vectors to field based, the frame motion vector may be employed for each of the top and bottom field motion vectors. A difference between the embodiments illustrated in FIG. 5 and FIG. 6 is whether the macroblock is stored as a frame macroblock or a field macroblock. As previously discussed, if it is stored as a frame macroblock, then interleaving is performed as illustrated in FIG. 5. In contrast, as illustrated in FIG. 6, if the macroblock is stored as a field macroblock, then interleaving is performed, as illustrated, and the data lines may be processed as previously described for an interleaved field format.

The paragraph that runs from page 28, line 4 to page 28, line 17 has been rewritten, as follows:

Another aspect of an embodiment in accordance with the invention is the display of the decoded video images that are downsampled in the frequency domain, such as an MPEG2 image in the DCT domain, although the invention is not limited in scope in this respect. In this

particular embodiment, the video decoder subsystem discussed above is coupled to a video display subsystem, as [,as] illustrated in FIG. 10. Both the video decoder subsystem and the video display subsystem may be coupled [couple] with the memory subsystem, where decoded video images may reside. As illustrated in FIG. 10, in the memory subsystem, the decoded video images are labeled as video buffer 1, video buffer 2 and so on. The number n of decoded video images may be chosen according to the video decoder and video display subsystems. In such an embodiment, besides typical information, such as the decoded image size (X, Y), the video decoder subsystem may be coupled [couples] with the video display subsystem with additional signals, such as the Picture Type (PICT) and the vertical subsampling factor (VSFF), that relate to the transform-domain downsampling operation. Signals such as PICT and VSFF may be used to adjust the video display subsystem to properly display the decoded video images that are downsampled in the transform domain using an embodiment in accordance with the invention.

The paragraph that runs from page 31, line 2 to page 31, line 8 has been rewritten, as follows:

Let the distance between two adjacent lines in a field be 1 unit. As illustrated in FIG. 12, for the non-downsampled field-type video image, the first line in the bottom field (line 1) is 0.5 unit below the first line in the top field (line 0). This is also true for the subsequent lines in the top and bottom fields. The results of a DDA-based vertical scaling operation for uniformly-positioned interlaced video source are illustrated in FIG. 15. The example shows the upscaling factor of 3:8. FIG. 15 (a) is the case of scaling from the top field with an initial phase of DDA[0] = 0.0, and FIG. 15(b) is the case of scaling from the bottom field with an initial phase of DDA[0] = -0.5.

MARKED-UP VERSION OF THE CLAIMS TO SHOWN CHANGES MADE

Claims 1, 11, 16, 23, 28, and 32 have been rewritten, as follows:

1 (Amended). A method of performing video image decoding comprising:

downsampling a compressed video image in the frequency domain;

inverse transforming the downsampled video image; and

performing motion compensation for the downsampled image in the spatial domain, the performing of the motion compensation comprising scaling motion vectors in accordance with a downsampling ratio.

11 (Amended). The method of claim [10] 1, wherein motion vector scaling comprises implementing an interpolation operation.

16 (Amended). A method of performing video image decoding comprising:

inverse transforming a compressed video image;

downsampling [downsamping] the inverse transformed image in the spatial domain; and

performing motion compensation for the downsampled image in the spatial domain, the performing of the motion compensation comprising scaling motion vectors in accordance with a downsampling ratio.

23 (Amended). The method of claim 16 [22], wherein motion vector scaling comprises implementing an interpolation operation.

28 (Amended). An article comprising: a storage medium, having stored thereon instructions, that when executed by a platform, result in the following:

downsampling a compressed video image in the frequency domain;

inverse transforming the downsampled video image; and

performing motion compensation for the downsampled image in the spatial domain, the performing of the motion compensation comprising scaling motion vectors in accordance with a downsampling ratio.

32 (Amended). An article comprising: a storage medium, having stored thereon instructions, that when executed by a platform, result in the following:

inverse transforming a compressed video image;

downsampling [downsamping] the inverse transformed image in the spatial domain; and

performing motion compensation for the downsampled image in the spatial domain, the performing of the motion compensation comprising scaling motion vectors in accordance with a

downsampling ratio.